

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *NSD VM-2A-32* at our website: *Click HERE*

NSD Corporation

No. NSP-Z1036-2b

Abyocoder

VM-2A
VM-2AG

Specifications & Operation Manual

Applicable sensor:
MRE-32SP062
MRE-G[ ]SP062

GENERAL SAFETY RULES

(Please read this safety guide carefully before operation)

Thank you very much for purchasing our product.
Before operating this product, be sure to carefully read this manual so that you may fully understand the product, safety instructions and precautions.

- Please submit this manual to the operators actually involved in operation.
- Please keep this manual in a handy place.

Signal Words

Safety precautions in this guide are classified into DANGER and CAUTION.

Symbol	Meaning
DANGER	Incorrect handling may cause a hazardous situation that will result in death or serious injury.
CAUTION	Incorrect handling may cause a hazardous situation that will result in moderate injury or physical damage.

Instructions accompanied by a symbol CAUTION may also result in serious damage or injury. Be sure to follow the all instructions accompanied by the symbol.

Graphic Symbols

Symbol	Meaning
	Indicates prohibited items.
	Indicates items that must be performed to.

Application Limitation

This product is not designed to be used under any situation affecting human life. When you are considering to use this product for special purposes such as medical equipment, aerospace equipment, nuclear power control systems, traffic systems, and etc., please consult with NSD.

1. Handling Precautions

DANGER

- Do not touch components inside of the controller; otherwise, it will cause electric shock.
- Do not damage the cable by applying excessive load, placing heavy objects on it, or clamping; otherwise, it will cause electric shock or fire.
- Turn the power supply OFF before wiring, transporting, and inspecting the controller; otherwise, it may cause electric shock.
- Provide an external safety circuit so that the entire system functions safely even when the controller is faulty.
- Connect the grounding terminal of the controller; otherwise, it may case electric shock or malfunction.

CAUTION

- Do not use the controller in the following palces; water splashes, the atmosphere of the corrosion, the atmosphere of the flammable vapor, and the side of the combustibility. Doing so may result in fire or the controller may become faulty.
- Be sure to use the controller and the ABSOCODER sensor in the environment designated by the general specifications in the manual. Failure to do so may result in electric shock, fire, malfunction or unit failure.
- Be sure to use the specified combination of the ABSOCODER sensor, controller and sensor cable; otherwise, it may cause fire or controller malfunction.

2. Storage

CAUTION

- Do not store the controller in a place exposed to water, or toxic gas and liquid.
- Be sure to store the controller in designed temperature and humidity range, and do not exposed to direct sunlight.
- Be sure to consult with NSD when the controller is stored for long periods.

3. Transport

CAUTION

- Do not hold the cable or shaft of ABSOCODER sensor during transport; otherwise, it will cause injury or controller malfunction.

4. Installation

CAUTION

- Do not step on the controller or place heavy objects on the controller; otherwise, it will cause injury.
- Do not block the exhaust port or allow any foreign matter to enter the controller; otherwise, it will cause fire or unit failure.
- Be sure to secure the controller and ABSOCODER sensor with the provided brackets; otherwise, it may cause malfunction, injury, or drop.
- Be sure to secure the specified distance between the main body and the control panel or other equipments; otherwise, it may cause malfunction.

5. Wiring

DANGER

- Be sure to secure the terminal block firmly; otherwise, it may have risk of fire.
- Be sure to mount the terminal cover provided with the controller, before supplying the power, starting operation after the installation, and wiring; otherwise, it may cause electric shock.

CAUTION

- Be sure to keep the sensor cable, control cable, and communication cable at least 300 mm away from the main circuit and power line; otherwise it may cause injury or malfunction.
- Be sure to connect all cables correctly; otherwise, it may cause injury or controller malfunction.
- Be sure to firmly connect the external I/O connectors and sensor connectors; otherwise, it may cause incorrect inputs and outputs or injury.

6. Operation

CAUTION

- Do not change the controller's function switch settings during the operation; otherwise, it will cause injury.
- Do not approach the machine after instantaneous power failure has been recovered. Doing so may result in injury if the machine starts abruptly, it will cause injury.
- Be sure to check that the power supply specifications are correct; otherwise, it may caused controller failture.
- Be sure to provide an external emergency stop circuit so that operation can be stopped with power supply terminated immediately.
- Be sure to conduct independent trial runs for the controller before mounting the controller to the machine; otherwise, it may cause injury.
- When an error occur, be sure to eliminate the cause, ensure safety, and reset the error before restarting operation; otherwise, it may cause injury.

7. Maintenance And Inspection

CAUTION

- Do not disassemble, remodel, or repair the unit; otherwise, it will cause electric shock, fire, and unit malfunction.
- The capacitor of the power line deteriorates through prolonged use. We recommended that the capacitor be replaced every five years to prevent secondary damage.

8. Disposal

CAUTION

- Be sure to handle the controller as industrial waste while disposing of it.

CONTENTS

1. Summary 1
2. Features 1
3. Configuration 1
4. Specifications 2
   4.1 Converter Specifications 2
   4.2 Sensor Specifications 3
   4.3 Extension Cable Specifications 3
5. Dimensions 4
   5.1 ABSOCODER Converter: VM-2A-32 / VM-2AG-32 4
   5.2 ABSOCODER Sensor 4
   5.3 Extension Cable 6
6. Installation 7
   6.1 Converter Installation Conditions & Precautions 7
   6.2 ABSOCODER Sensor Installation Conditions & Precautions 7
7. Wiring 8
   7.1 Converter & Sensor Connection 8
   7.2 Power Supply Connection 9
   7.3 Input / Output Connector Connection 10
8. Nomenclature 11
   8.1 Part Identification 11
9. Operation 12
   9.1 Operation Sequence 12
   9.2 Zero Setting Procedure 13
   9.3 Position Data Reading 14
10. Maintenance & Inpections 15
   10.1 Inspection 15
   10.2 Troubleshooting 15
11. Ordering Information 16

1. Summary

The VM-2A converter is used in conjunction with a multi-turn type ABSOCODER sensor.
Absolute position data (65536 divisions) read by the ABSOCODER sensor is converted to a 16-bit binary digital output by the VM-2A ABSOCODER converter.

2. Features

(1) Latch Pulse Output

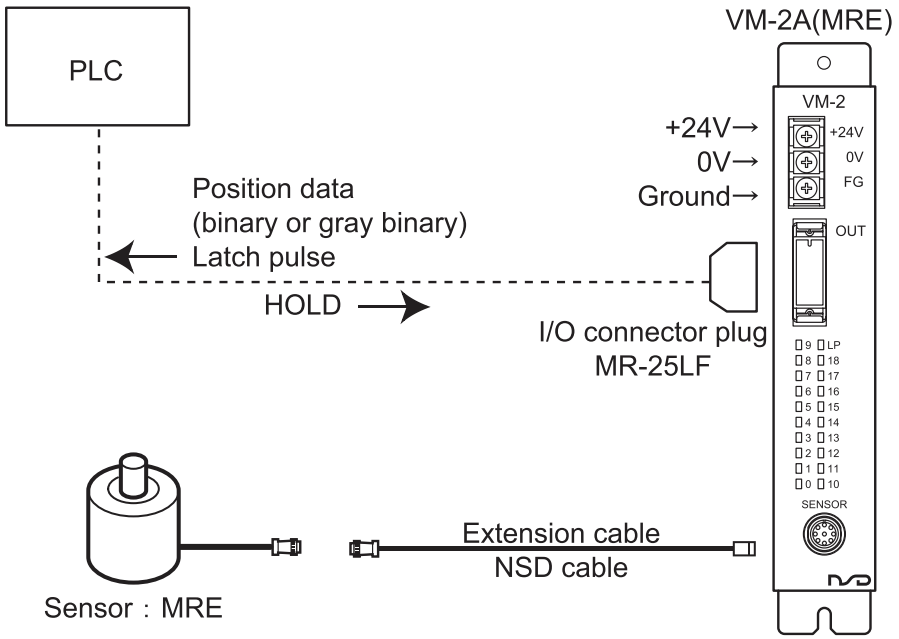
Position data is read in a periodic manner, synchronizing with the latch pulse signal output. This reading format is suitable for a high-speed response system.

(2) Data HOLD Input

The HOLD input signal stops the position data updating. This HOLD is required for a given period of time to enable stable data reading in accordance with the scan time or input filter time constant of the programmable controller, etc.

3. Configuration

● Configuration Diagram



4. Specifications

4.1 Converter Specifications

(1) General Specifications

Item	Specifications
Power supply voltage	24 VDC±10%（including ripple）
Power consumption	0.3A or less
Insulation resistance	20MΩ or more across DC power and ground terminals (by 500 VDC insulation resistance tester)
Withstand voltage	500 VAC, 60Hz for 1 minute across DC power and ground terminals
Vibration resistance	20m/s^2 , 10 to 500Hz, 10cycles of 5 minutes in 3 directions, conforms to JIS C 0091 standard
Ambient operating temperature	0 to ＋45℃
Ambient operating humidity	20 to 90% RH（no dew condensation）
Operating atmosphere	Free from corrosive gases and excessive dust
Storage temperature	－10 to＋60℃
Grounding	Must be securely grounded (ground resistance of 100 ohm or less).
Construction	Book-shelf type within enclosure
Outer dimensions（mm）	40 (W)×124 (D)×225 (H)　Refer to dimensions for details.
Mass	0.8kg

(2) Performance Specifications

Item	Specifications	
Model	VM-2A-32	VM-2AG-32
Position detection format	Absolute position detection by ABSOCODER sensor	
Number of divisions	65536	
Output code	Binary (16-bit)	Gray binary (16-bit)
Position data sampling time	0.1 ms	

(3) Input/Output Specifications

Item		Specifications
Input	Signal name	HD (Position data HOLD signal)
	Input circuit	Photo-coupler isolation
	Logic	－
	Rated input voltage	24 VDC
	Rated input current	10 mA
	ON voltage	10 VDC or more
	OFF voltage	4 VDC or less
Output	Signal name	$\overline{D0}$ - $\overline{D15}$ (Position data): 16 points LP (Latch pulse signal): 1 point
	Output circuit	Transistor open-collector
	Logic	Negative logic
	Rated load voltage	24 VDC (30 VDC max.)
	Max. load current	70 mA/point
	Max. voltage drop when ON	0.8V or less

4.2 Sensor Specifications

Item		Specifications					
Model		MRE-32SP062	MRE-□SP062				
			G64	G128	G160	G256	G320
Number of turns		32	64	128	160	256	320
Divisions/Turn		2048	1024	512	409.6	256	204.8
Mass (kg)		1.5	1				
Moment of inertia (kg・m^2)		6.7×10^{-6}	3.9×10^{-6}				
Starting torque (N・m)		4.9×10^{-2} or less					
Permissible shaft load (N)	Radial	98					
	Thrust	49					
Permissible mechanical speed (r/min)		3600					
Bearing Life		3.0×10^{4}Hr (at 3600r/min)	1.5×10^{4}Hr (at 3600r/min)				
Ambient temperature	Operating (℃)	-20 to +60					
	Storage (℃)	-30 to +90					
Vibration resistance		2.0×10^{2}m/s^2 , 200Hz , up/down/ forward/back ×3 times each, conforms to JIS D1601 standard					
Shock resistance		4.9×10^{3}m/s^2 , 0.5ms , up/down/forward/back ×3 times each, conforms to JIS C5026 standard					
Protection rating		IP52F conforms to JEM 1030 standard					
Max. cable Length (m)	Standard cable	4P-S 100m					
	Robotic cable	4P-RBT 40m	4P-RBT 70m				

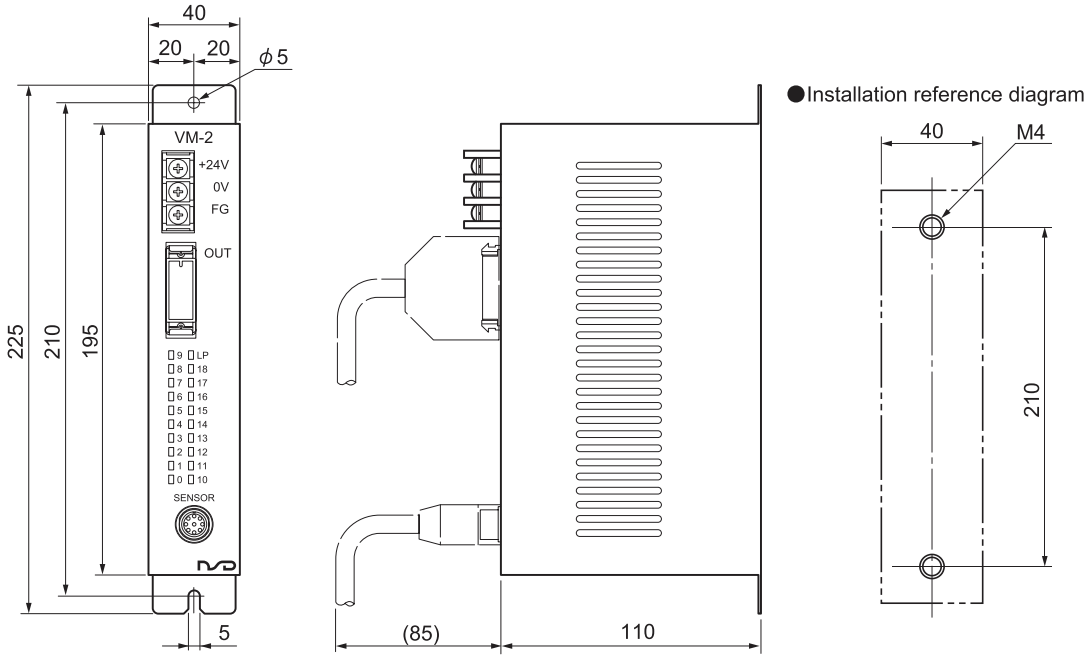
4.3 Extension Cable Specifications

Item	Specifications	
Model	4P-S-□	4P-RBT-□
Cable type	Standard cable	Robotic cable
Operating temperature range	−5 to +60℃	
Characteristics	Extensible for long distance	Superior flexibility; ideal for moving components
Insulator	Irradiated, formed polyethylene	ETFE plastic (resin)
Sheath	Polyvinyl chloride (PVC) mixture	
Color	Gray	Black

5. Dimensions

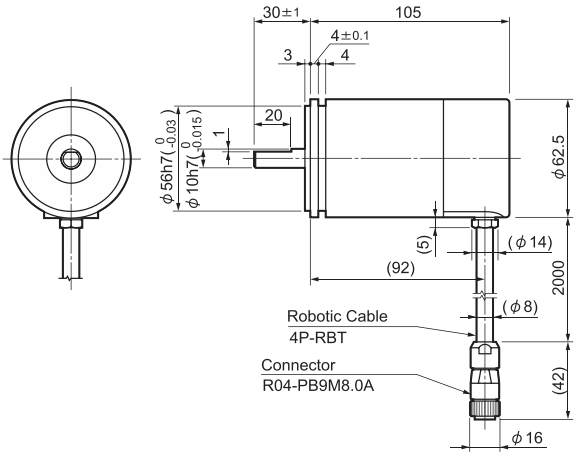
5.1 ABSOCODER Converter: VM-2A-32 / VM-2AG-32

Unit: mm

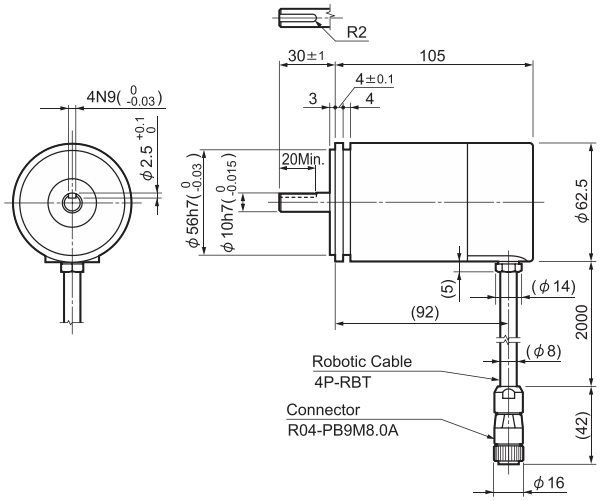


5.2 ABSOCODER Sensor

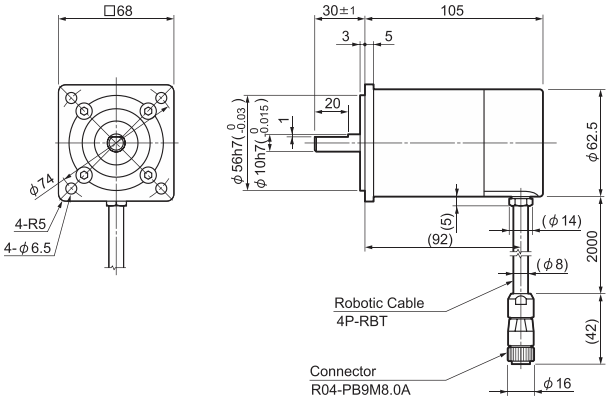
(1) MRE-32SP062SAC: Servo-mount type



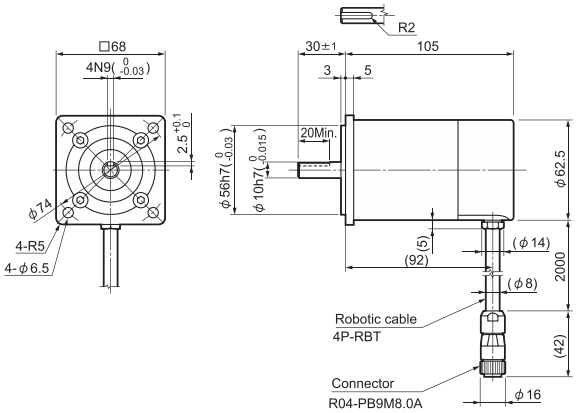
(2) MRE-32SP062SBC: Servo-mount type



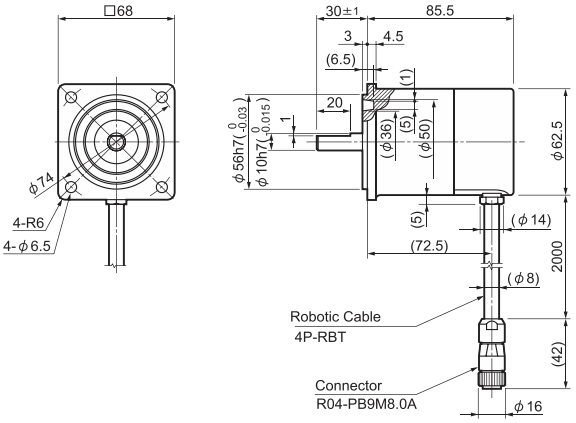
(3) MRE-32SP062FAC: Flange-mount type



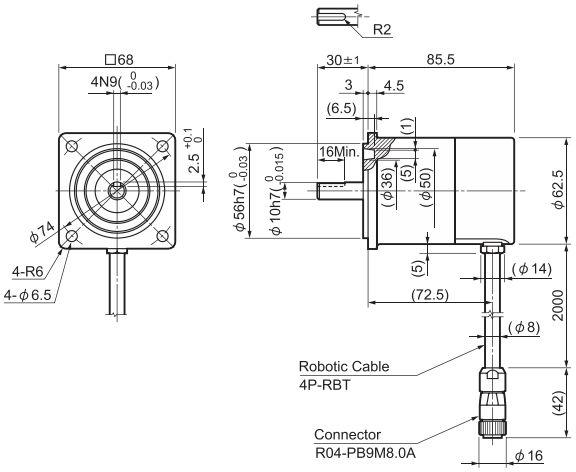
(4) MRE-32SP062FBC: Flange-mount type



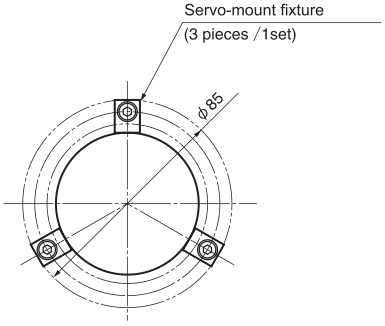
(5) MRE-G□SP062FAC: Flange-mount type



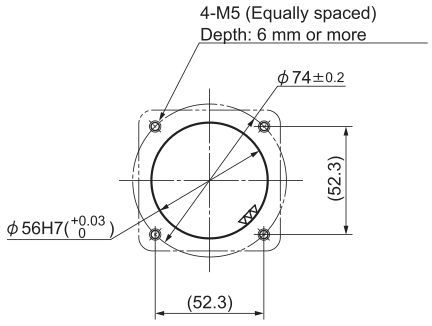
(6) MRE-G□SP062FBC: Flange-mount type



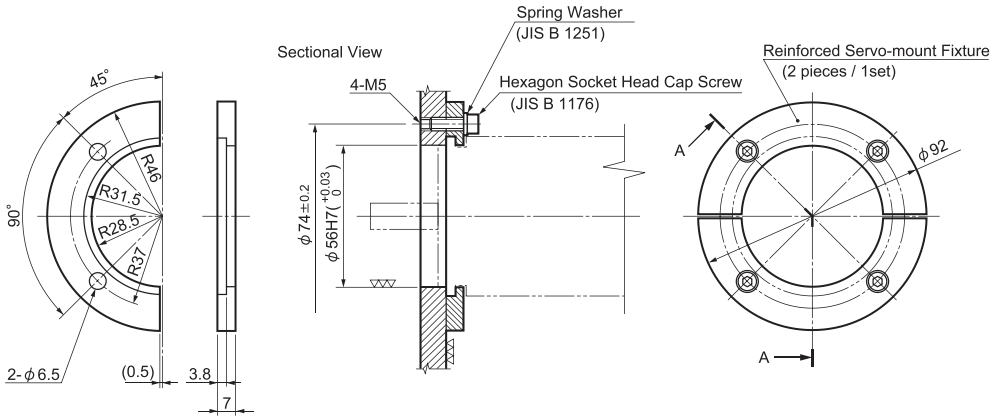
●Mounting hole dimensions for servo-mount fixture



●Mounting hole dimensions for flange

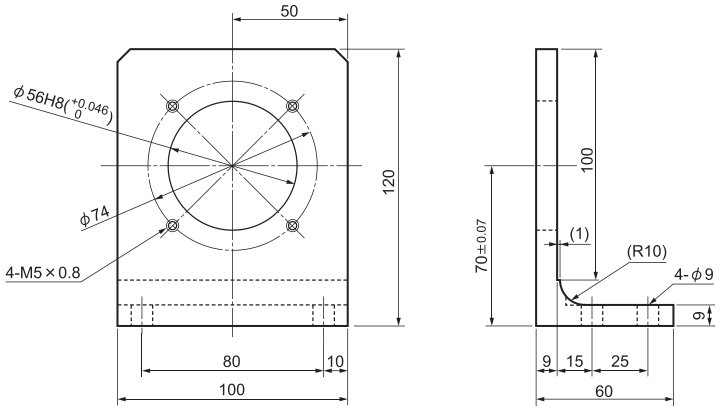


●Mounting fixture reinforced Servo-mount　(2 piece set)



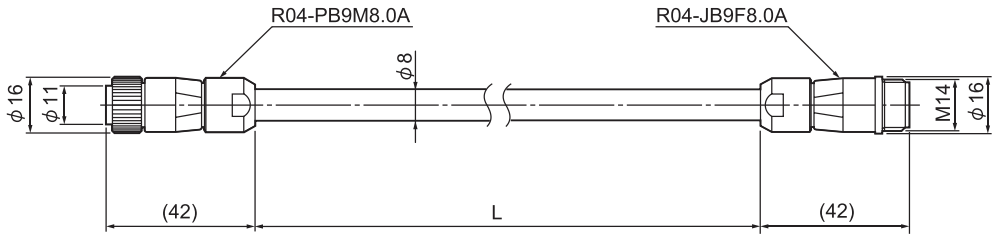
o Option RB-01 (L type flange for MRE-32SP062 and MRE-G□SP062)

Note: Used for flange type and reinforced servo type mounts.



5.3 Extension Cable

(1) 4P-S-0102-[L] / 4P-RBT-0102-[L]



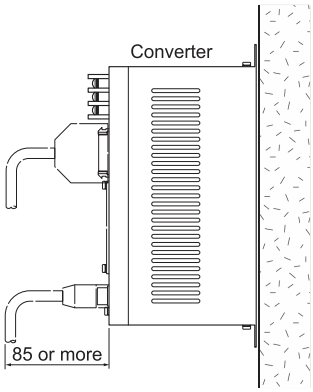
6. Installation

The installation conditions and precautions for each of the system components are described in this section.

6.1 Converter Installation Conditions & Precautions

● **Installation Site**

(1) Avoid sites where the unit is exposed to direct sunlight.
(2) The ambient temperature should never exceed a 0-45℃ range.
(3) The ambient humidity should never exceed a 20-90% RH range.
(4) Do not install the unit in areas where condensation is likely to occur (high humidity with extreme temperature changes).
(5) Avoid sites where dust is excessive.
(6) Do not install in areas with an excessive amount of salt and/or metal chips.
(7) Do not install in areas where flammable and/or corrosive gases are present.
(8) Avoid areas where splashing water, oil or chemicals are likely to occur.
(9) Avoid areas where vibration and shocks are excessive.



● **Installation Precautions**

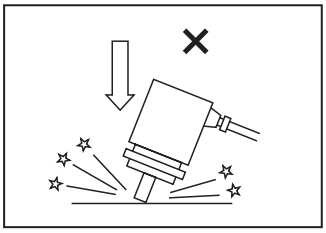
(1) The unit should firmly secured by two M4 bolts.
(2) Noise prevention measures should be taken.
- Install as far as possible from high-voltage lines and power lines.
- Mount on a grounded metal plate.

(3) A space of approximately 85 mm is required in front of the Controller to plug in and unplug the connectors.

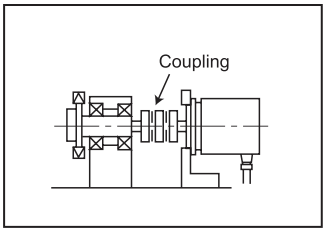
6.2 ABSOCODER Sensor Installation Conditions & Precautions

Installation of rotary type ABSOCODER sensor

(1) Do not subject the sensor to excessive shocks and unbalanced loads.



(2) If connected to a shaft, a coupling format should be used.



For the installation conditions and precautions for ABSOCODER sensor, refer to “ABSOCODER HANDLING PRECAUTION”(NSP-Z2022). This manual is available upon request.

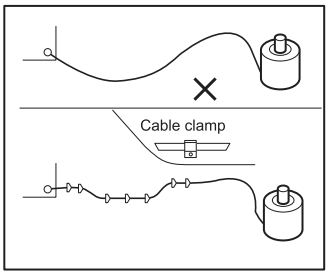
7. Wiring

7.1 Converter & Sensor Connection

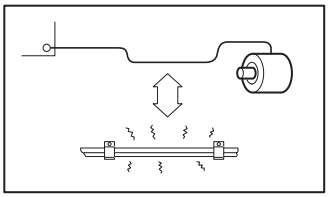
The ABSOCODER converter and ABSOCODER sensor connection is described below.
The maximum extension cable length varies according to the ABSOCODER sensor and cable models being used. (Refer to section 4.2 for details.)

● **Wiring Precautions**

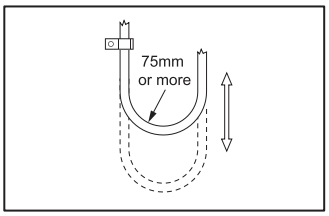
(1) The sensor cable should be clamped as shown at right to prevent excessive tension from being applied to the cable connectors.



(2) The sensor cable should be located as far as possible from power lines and other lines which enerate a high level of electrical noise.

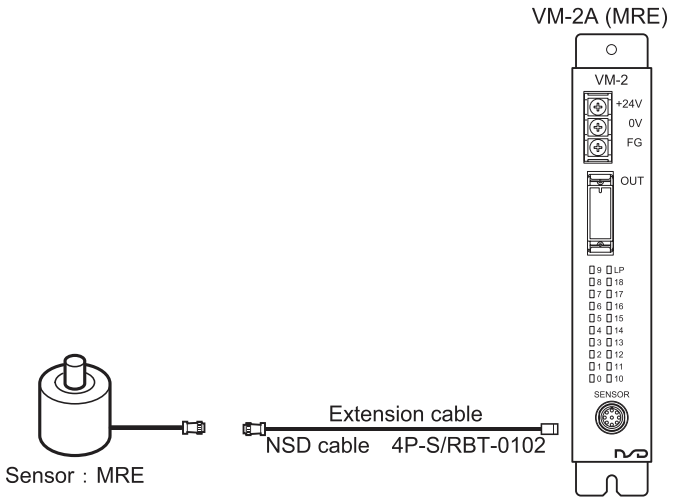


(3) If the cable movement (when used at moving component) is such that it is bent into a U-shape, a robotic cable or a heat-resistant cable should be used.
The bend radius should never be less than 75 mm.



● **Sensor Cable Connection Diagram**

Connecting of NSD standard cable

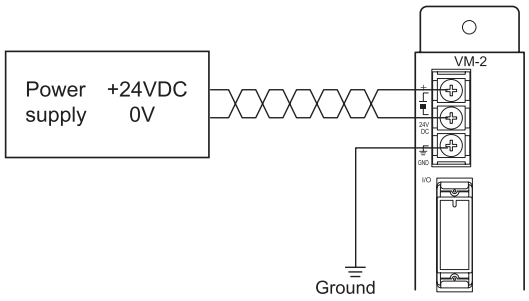


7.2 Power Supply Connection

The power supply should be connected as described below.

(1) Power Supply
- Power Supply voltage: 24 VDC ± 10% (including ripple)
- Power consumption: 0.3A
- Rush current: 1.2A (rush time of 40ms)
- The input power supply should be isolated from the commercial power supply (power supply furnished by the power company).
- Use the R3 type crimp lug terminals with insulating sleeves in order to prevent shorting caused by loose screws.
- The power cable should be as thick as possible to minimize voltage drops.
- Twist the power cable.

(2) Ground
- The unit should be securely grounded (ground resistance of 100 ohm or less) to prevent electrical shocks.
- The ground cable should be as thick as possible.

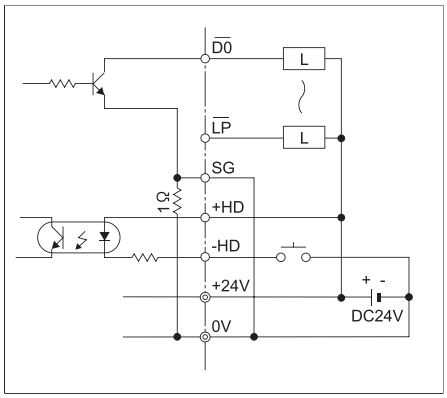


7.3 Input / Output Connector Connection

Output lead wires should be soldered to pins of the output connector according to the output chart below. 0.3 mm² is recommended for the lead wire's nominal cross-sectional area.

Pin No.	Signal Name
1	$\overline{D0}$ $\overline{2^0}$
2	$\overline{D1}$ $\overline{2^1}$
3	$\overline{D2}$ $\overline{2^2}$
4	$\overline{D3}$ $\overline{2^3}$
5	$\overline{D4}$ $\overline{2^4}$
6	$\overline{D5}$ $\overline{2^5}$
7	$\overline{D6}$ $\overline{2^6}$
8	$\overline{D7}$ $\overline{2^7}$
9	$\overline{D8}$ $\overline{2^8}$
10	$\overline{D9}$ $\overline{2^9}$
11	$\overline{D10}$ $\overline{2^{10}}$
12	$\overline{D11}$ $\overline{2^{11}}$
13	$\overline{D12}$ $\overline{2^{12}}$
14	$\overline{D13}$ $\overline{2^{13}}$
15	$\overline{D14}$ $\overline{2^{14}}$
16	$\overline{D15}$ $\overline{2^{15}}$
17	Not used
18	Not used
19	Not used
20	Not used
21	+HD (+24VDC)
22	-HD (Data is held at low level)
23	$\overline{LP}$ Latch pulse
24	SG Signal ground
25	SG Signal ground

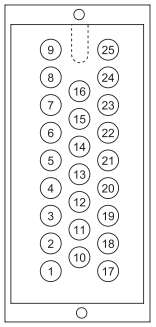
●I/O Circuit



※Internal connection with 1 ohm resistance between SG and 0V.

●Pin arrangement

Connector model : MR-25F



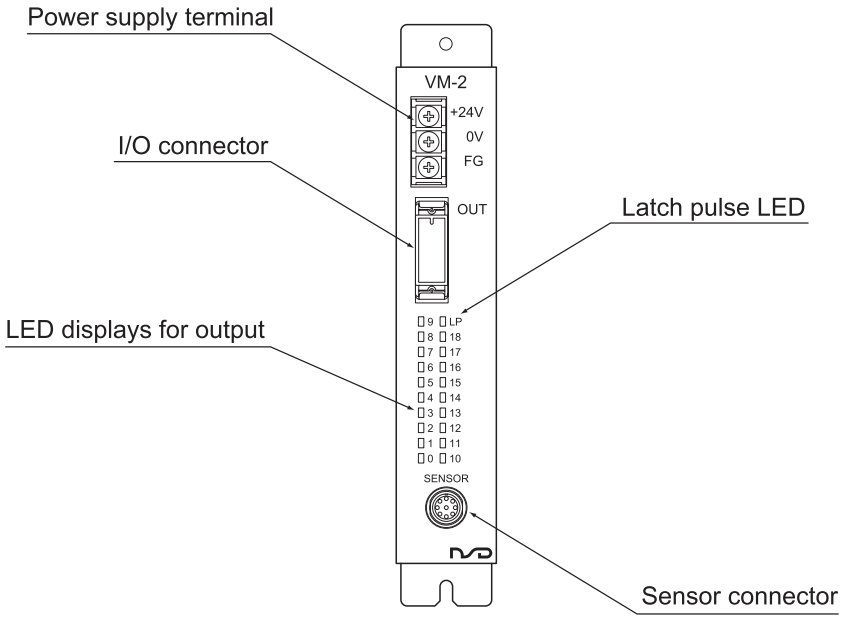
Viewed from the soldered terminals on the rear side of the connector.

●Signal Names & Descriptions

Signal Name		Descriptions
Output	$\overline{D0}$～$\overline{D15}$	Position data is output as 16-bit binary values.
	$\overline{LP}$	Latch pulse for position data outputs.
Input	+HD -HD	Stops position data changes when the position data is read to the programmable controller, etc.

8. Nomenclature

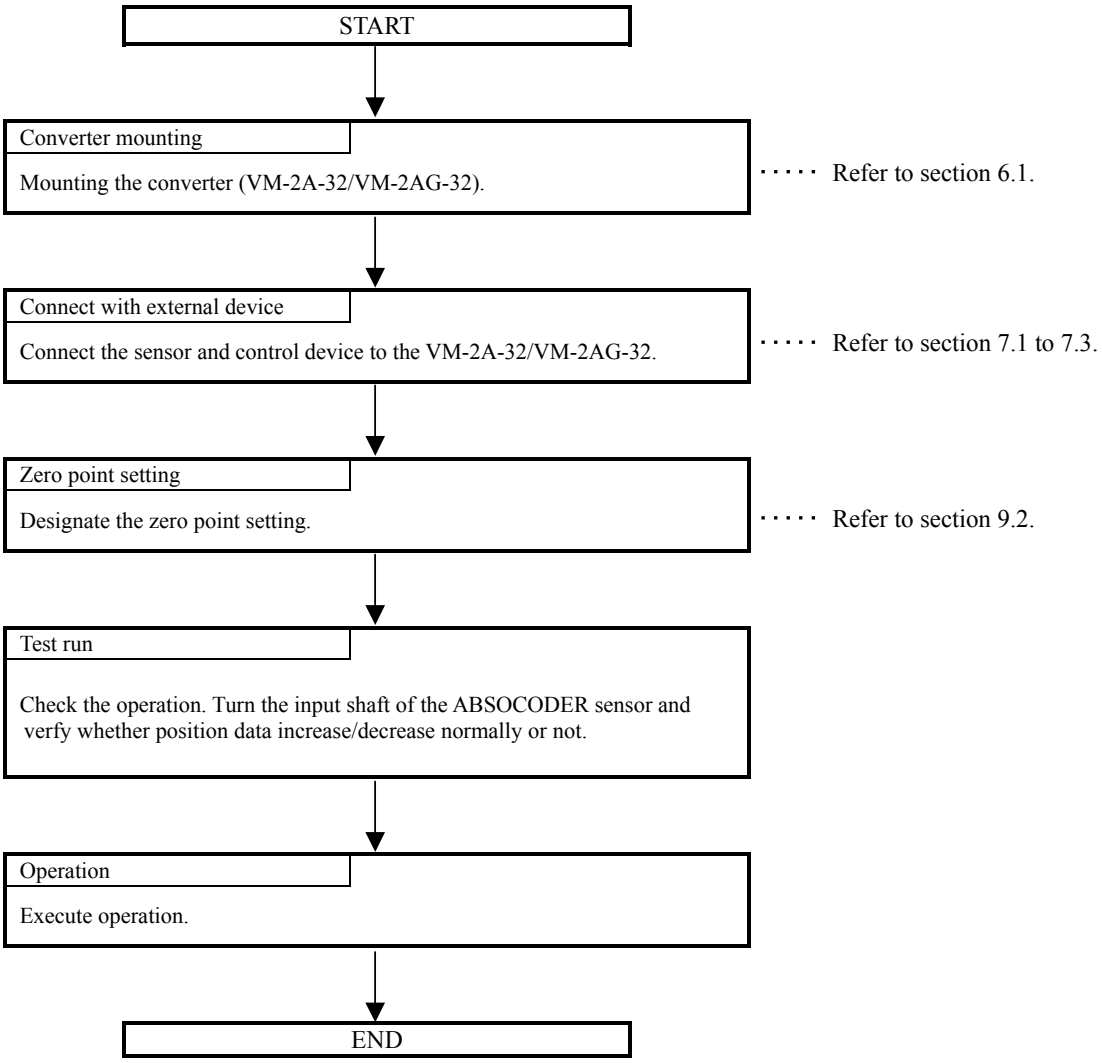
8.1 Part Identification



9. Operation

9.1 Operation Sequence

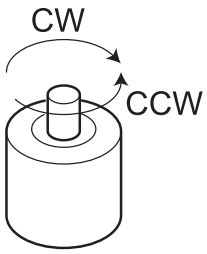
The VM-2A operation sequence is shown below.



9.2 Zero Setting Procedure

In the absolute measuring system, all machine positions are measured from a fixed datum point of the machine. This is a mechanical zero point and may be a starting point or reference point for the process or operation. On the other hand, this system uses the ABSOCODER, an absolute position sensor and has its own electrical zero. Therefore, the zero points of both the machine and this system must be exactly aligned during the initial installation.

(1) Ensure that the ABSOCODER position sensor, converter, and interconnecting sensor cable (including an optional extension cable) are connected securely.
(2) Turn on input power of the converter.
(3) Observing the indication of the LED's on the converter, turn the input shaft of the ABSOCODER until all the LED's come OFF. Usually position data increase in a clockwise direction as viewed from its input shaft end.



(4) Manually locate the machine axis to its mechanical zero point.
(5) Clamp the coupling between the machine shaft and the ABSOCODER's input shaft.
(6) Loosen the ABSOCODER mounting screws (servo-mount bolts) slightly so that the outer case may be turned by hand.
(7) Verify that the machine is at its zero point. If required, adjust the ABSOCODER sensor by holding and turning the case by hand until all LED's are OFF on the converter, and then tighten the mounting screws to fix the ABSOCODER sensor in place.

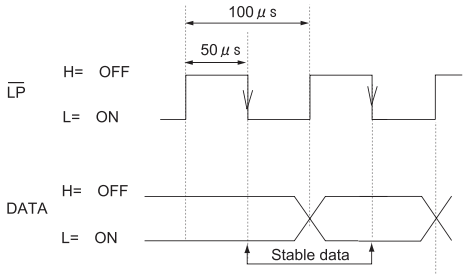
* When an extension cable is used, this system should be aligned with the external system's zero (mechanical zero) after the extension cable has been connected to the sensor cable.

9.3 Position Data Reading

Position data reading is possible using either a "Latch Pulse Signal" or a "Hold Signal" format.

(1) Reading with Latch Pulse (LP) Signal Format

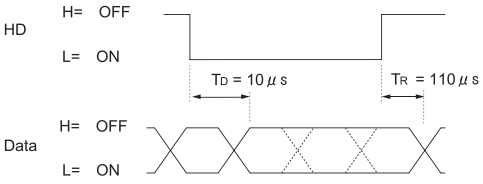
This format is recommended for high-speed reading. Position data is read in a periodic manner, coinciding with the latch pulse signal output.



Position data ($\overline{D0}$ to $\overline{D15}$) are stable at the trailing edge of the Latch Pulse Signal ($\overline{LP}$).

(2) Reading with HOLD Signal Format

The Hold signal stops the position data updating. This HOLD is required for a given period of time to enable stable data reading in accordance with the scan time or input filter time constant of the programmable controller, etc.. The programmer controller switches the HOLD signal ON to stop the data updates, and reads the data during this stop period. The HOLD signal is switched OFF after the data is read, and a data update occurs.

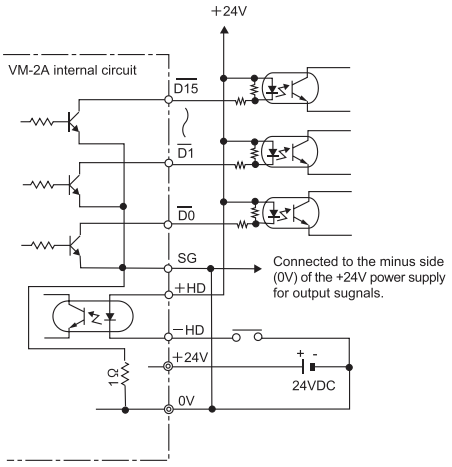


When a "HOLD" status is establishied for position data output, the latch pulse output is held at low (ON) state.

TD: HOLD response time
TR: Waiting time until HOLD signal switched ON

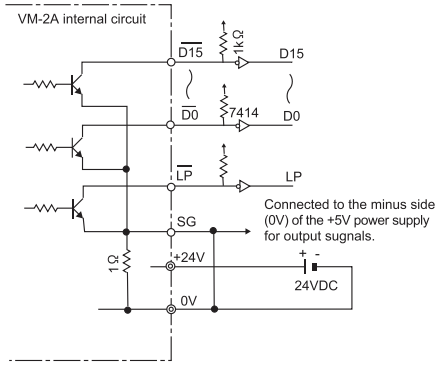
(3) Connection example

●When connected to a programmable controller unit with a rated voltage 24V



Notes:
(1)Internal connection with 1 ohm resistance between SG and 0V.
(2)The response time of the input unit, etc., must be taken into consideration when determining the data reading timing following a "data hold" status.

●Connected to a TTL



Note:
Internal connection with 1 ohm resistance between SG and 0V.

10. Maintenance & Inpections

The inspection should be conducted once every 6 months to a year.
Any inspected items which do not satisfy the criteria shown below should be repaired.

10.1 Inspection

Inspection Item	Inspection Description	Criteria	Remarks
Power supply	Measure voltage fluctuation at the power supply terminal block to determine if it is within the prescribed range.	Power supply voltage fluctuation must be within a 22 - 26 VDC range.	Tester
Ambient conditions	Check the ambient temperature.	Sensor: -20 to +60℃ Converter: 0 to +45℃	Thermometer
	There should be no accumulation.	None	
External output Power supply	Check the voltage fluctuation at the output connector plug to determine if it is within the prescribed range.	30 VDC or less	Tester
Mount condition	Verify that the sensor is securely mounted.	There should be no looseness.	
	Verify that the sensor shaft is securely coupled to the machine shaft.	There should be no looseness.	
	Check for severed cables.	Cable should be appear normal.	Visual inspection
	Verify that the sensor cable connector is plugged in all the way.	There should be no looseness.	
	Verify that the output connector is plugged in all the way.	There should be no looseness.	

10.2 Troubleshooting

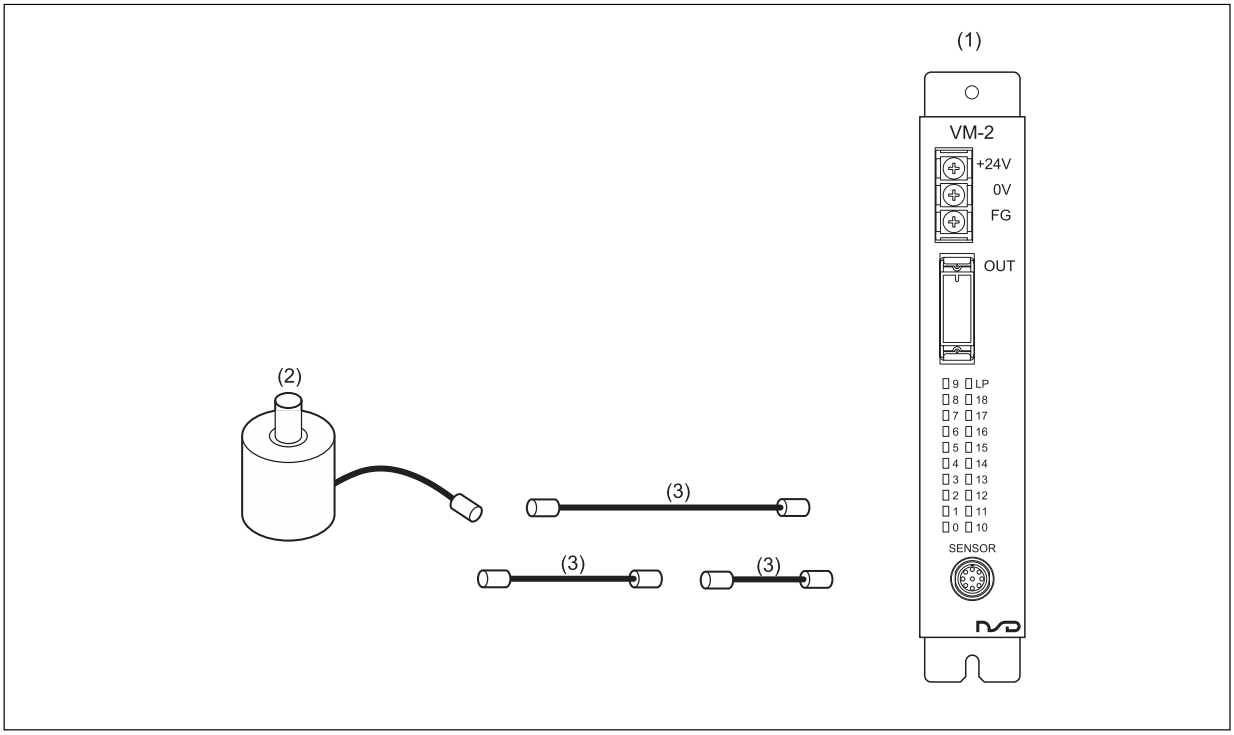
The causes and corrective actions for errors which may occur during VM-2A operation are described below.

Error Item	Cause	Countermeasure
Deviation in origin point position.	- Coupling of sensor shaft and machine shaft is loose. - Loose sensor mounting.	Secure the coupling/mounting.
Incorrect position data output.	- Latch pulse timing is improper for the controller in question. - Latch pulse and position data reading timing is improper. - HOLD signal output timing is improper.	Designate the correct function selector switch setting, or correct the reading timing.
	- Output signal wiring problem.	Repair the wiring.
Position data HOLD doesn't occur.	- No External power supply for outputs, or voltage is outside the prescribed range.	Supply the power voltage.
No position data output.	- No external power supply for outputs, or voltage is outside the prescribed range.	Supply the proper voltage.

If the troubleshooting procedures described above fail to solve the problem, the sensor or converter may be defective. In this case, please contact your NSD representative.

11. Ordering Information

●Configuration & Combinations



●Model List

	Name	Model	Remarks		
(1)	Converter	VM-2A-32	16-bit Binary		
		VM-2AG-32	16-bit Gray Binary		
(2)	Sensor	MRE-32SP062SAC	Servo-mount type	[*] : Number of turns 64, 128, 160, 256, 320	With a 2m cable
		MRE-32SP062SBC	Servo-mount type		
		MRE-32SP062FAC	Flange-mount type		
		MRE-32SP062FBC	Flange-mount type		
		MRE-G[*]SP062FAC	Flange-mount type		
		MRE-G[*]SP062FBC	Flange-mount type		
(4)	Extension cable	4P-S-0102-[L]	Standard cable (NSD connector)		
		4P-RBT-0102-[L]	Robotic cable (NSD connector)		

Note: Specify the desired connector type and cable length at each box.

NSD Group

Manufacturer
NSD Corporation 3-31-28, OSU, NAKA-KU, NAGOYA, JAPAN 460-8302

Distributor
NSD Trading Corporation 3-31-23, OSU, NAKA-KU, NAGOYA, JAPAN 460-8302
Phone: +81-52-261-2352 Facsimile: +81-52-252-0522
URL: www.nsdcorp.com E-mail: foreign@nsdcorp.com
Copyright©2020 NSD Corporation All rights reserved.

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP